Preface

The achievement of sustainable development entails the integration of scientific approaches and environmental management, legislation, and policy making realities. Aquatic ecosystem management is a key element in this endeavour for sustainability, since water quality is an important prerequisite for human health and development. The health and integrity of aquatic ecosystems should therefore not only be regarded as important in its own right, but also be seen as an indicator, or barometer, of success in achieving sustainability.

Addressing this issue of integration within environmental assessment as well as between scientific assessment and policy making strongly depends on spatial scale. Indeed, it seems likely that the accuracy of our comprehension of processes decreases with increasing spatial scale. Therefore, the " scale issue" raises, among others, two types of questions regarding (i) the appropriateness of methods to the stakes, and (ii) the relevance of either the quality criteria or the remediation objectives.

Iterations between these scales followed by integration are necessary, and they need to be achieved consistently in order to produce relevant managerial approaches and to promote efficient remediation and préservation of aquatic ecosystems.

Aquatic ecosystems are very valuable to mankind since they perform many ecosystem functions like ground water recharging, nutrient recycling, water purification, etc.; provide habitat for biodiversity (flora, fauna and microbial organisms); augment and

maintain stream flow, water supply, fisheries, and provide recreation and tourism opportunities and are also part of religious, cosmological and folklore beliefs.

These fragile aquatic ecosystems and their biodiversity (known to support specialist species) are being lost at a phenomenal rate due to various threats like population explosion; unsustainable use of resources; unplanned, ecologically unfriendly development activities (urbanisation, industrialisation, mining); habitat alteration for transportation, agriculture, aquaculture, and dam construction for water supply and hydroelectricity generation; pollution and nutrient inputs from point and non-point sources (silt deposition carrying inorganic fertilizer, pesticides and herbicides applied to crops etc.); infilling for solid and liquid waste disposal; dredging and channelisation; over-fishing and dynamite fishing and introduction of exotic species. These threats are compounded by institutional and legal factors such as: lack of legislation or its enforcement; lack of scientific knowledge and the dearth of information in the field; destructive, unscientific policies; land ownership; official attitudes towards these ecosystems; lack of adequate trained staff for proper maintenance; lack of appropriate planning between various government departments in undertaking developmental activities; fund scarcity or misuse of available funds, etc. These threats have great impact on physical, chemical and biological processes in the ecosystem leading to catastrophic declines in the coverage of aquatic ecosystems around the world.

A growing concern is that the increasing availability of restoration technology and improved best-practice must not be used by developers to justify the further damage of the natural ecosystem. *There is definitely no replacement for in situ conservation of natural and seminatural habitats.* Hence, potential aquatic ecosystems need to be identified and safeguarded by the planning process. Restoration should be seen as a vital component of integrated watershed management planning.

The need of the hour is to develop an integrated and accelerated effort towards conservation, restoration and proper management of the aquatic ecosystems to stop further degradation. If not, it may result in sharply increased environmental cost, the extinction of species, permanent ecological damage and loss of ecosystem or ecosystem services essential for the very survival of mankind.

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